

# Traumatic Trapeziometacarpal Dislocation: Two Case Reports and Literature Review

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**Abstract** Trapeziometacarpal dislocation generally occurs due to trauma. Various treatment methods have been applied, including conservative and surgical options, however no gold standard approach exists for this rare injury. This study aims to report treatment outcomes of two traumatic trapeziometacarpal (TM) dislocation cases, including one patient who evolved with excellent functional outcome despite conservative treatment. A literature review of this uncommon hand injury is performed.

**Keywords** Trapeziometacarpal Joint, Dislocation, Thumb, Surgery

## 1. Introduction

Trapeziometacarpal dislocation is a rare hand injury<sup>1,2</sup>. Epidemiologically, it accounts for less than 1% of all hand traumas<sup>3</sup>. The lesion is usually due to an axial force transmitted through partially flexed thumb, forcing the joint to deflect toward dorsal<sup>2,4</sup>. Due to volar part of the ligament being thicker and stronger, dislocation occurs in dorsal direction<sup>1,2</sup>.

Optimal treatment strategy for traumatic TM dislocation remains under discussion. Closed reduction and cast, open or closed reduction with temporary K-wire fixation, and dorsal capsule and ligament reconstruction have been used to stabilize the joint<sup>2,5</sup>. Few cases have been reported however, and a protocol has yet to be developed<sup>6</sup>.

This study aims to report the outcomes of two traumatic trapeziometacarpal dislocation cases and perform a literature review.

## 2. Case Reports

### 2.1. Patient 1

A 29 year old man, right-handed, was victim of a bicycle accident. Left hand examination in the emergency room showed deformity and swelling at the dorsolateral region,

evaluating with pain and functional thumb disability. Anteroposterior and oblique radiographs showed dorsal TM joint dislocation. (Figures 1A and 1B)



Figure 1A



Figure 1B

**Figures 1. 1A and 1B** - Anteroposterior and oblique hand X-Ray views showing dorsal trapeziometacarpal dislocation

Treatment was performed by intra-articular local anesthesia with lidocaine 2%, followed by closed TM reduction and placement of a cast including the thumb. Follow-up with weekly X-Ray until 6 weeks was performed. Physical therapy was prescribed. After nine months, clinical examination showed absence of pain, normal thumb and

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hand movements, and strength without losing hand grasp. Excellent functional result was obtained, and the patient returned to work without daily activity limitations (Figures 2A and 2B).



Figure 2A



Figure 2B

**Figure 2. 2A and 2B** – Anteroposterior and oblique hand X-Ray views showing the TM joint 9 months after injury

## 2.2. Patient 2

A 49 year old man was involved in a motorcycle accident. Right hand examination showed pain and thumb functional disability. Anteroposterior X-Ray showed trapeziometacarpal dislocation (Figure 3). After lidocaine injection, reduction was performed, but the joint remained unstable. The patient was scheduled for closed reduction and K-wire percutaneous fixation (Figure 4). After 6 weeks, K-wires were removed, and the patient started physical therapy (Figure 5). Despite partial reduction loss shown 1 month after K-wire removal, normal function was reestablished, and the patient was pain free after 6 month follow-up (Figure 6).



**Figure 3.** X-Ray in AP hand view showing TM dislocation



**Figure 4.** X-Ray in AP view showing percutaneous TM fixation (K-wires)



**Figure 5.** 6 weeks after K-wire fixation



Figure 6A



Figure 6B

**Figure 6. 6A and 6B and:** X-Ray in AP and lateral views. Observe partial TM reduction loss

### 3. Discussion

Traumatic TM dislocation is associated with varying degrees of ligaments and capsule injuries. Anterior oblique ligament is a short and strong structure. For many years, it was considered the key stabilizer to prevent dorsal joint dislocation<sup>1</sup>. Bettinger et al<sup>7</sup> reported that anterior oblique, radial, and ulnar collateral ligaments should be considered the main dynamic thumb stabilizers. Harvey<sup>8</sup> and Pagalidis<sup>9</sup> proposed oblique posterior and intermetacarpal ligaments as contributing to joint stability. However in a cadaveric study, Strauch et al<sup>10</sup> demonstrated that the dorsoradial ligament complex was the limiter of dorsal dislocation and responsible for obtaining joint stability. These findings were clinically confirmed by Shah et al<sup>4</sup>, who observed no ligaments or volar capsule injuries in four TM dislocation cases. Fotiadis et al<sup>11</sup> found the capsulo-ligamentar complex completely injured while the volar ligament was preserved.

Bosmans et al<sup>1</sup> showed promising results in two patients with isolated TM dislocation after closed reduction and plaster. Khan et al<sup>12</sup> found satisfactory results in a patient with bilateral TM dislocation treated by closed reduction and plaster. Kural et al<sup>13</sup> also found similar results after closed reduction and plaster in a TM dislocation patient. Like the other authors, a satisfactory outcome was obtained by applying closed reduction, cast, and physical therapy after a 9 month follow-up in the first patient.

When using closed reduction, percutaneous K-wire fixation necessity remains controversial. Watt et al<sup>14</sup> showed positive results in 12 patients treated by cast or K-wire fixation. One third of cast patients and two-thirds of K-wire patients had instability and dorsal joint subluxation. Discomfort and hand weakness was reported by all unstable joint patients. Despite partial reduction loss after K-wire removal, patient two evaluated with total functional recovery and pain free. Due to instability degree, K-wire removal was performed after six weeks. However, the literature recommends K-wire removal after four weeks for avoiding limitation of function. Jacobsen et al<sup>6</sup> showed a closed reduction and percutaneous K-wire fixation case that evolved with slight instability and radial subluxation.

Simonian et al<sup>15</sup> compared early ligament reconstruction with closed reduction and K-wire fixation. Ligament reconstruction group presented better outcomes, with normal range of motion, absence of pain, and full apprehension force. Chen<sup>2</sup> reported good results after dorsal ligament reconstruction. Shah et al<sup>4</sup> advocated that open reduction and fixation with Kirschner wires without ligament reconstruction would be inappropriate for this injury pattern.

Determining the appropriate treatment, especially rare, poorly reported injuries remains challenging. Several authors suggest conservative treatment with closed reduction and plaster when joint stability is achieved<sup>1,12,13</sup>. Other authors report that ligament reconstruction should be avoided in cases of acute injury. However, it seems that open or closed reduction plus K-wire percutaneous fixation may not always guarantee a good outcome<sup>2,4,6,14,15</sup>.

The present study contains several limitations. Small sample size lacked sufficient power to determine the best treatment option. Despite good outcome after partial joint reduction loss, several authors reported discomfort and weakness with the same injury pattern.

As strengths, the study reports two rare hand injury cases. As also described in the literature, the authors emphasize that, if the joint stability is achieved after reduction, plaster cast immobilization and physical therapy can produce good outcomes.

### 4. Conclusions

Despite partial reduction loss in the patient who underwent surgery, good outcomes were achieved in both cases.

More studies with higher evidence level are necessary to determine the gold standard treatment for this uncommon injury.

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